

## PATENT SPECIFICATION

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## DRAWINGS ATTACHED

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## (54) FILTERING DEVICE

(71) I, ALF JOHAN HAMRIN, of Swedish nationality, of Norntullsgatan 22, 113 45 Stockholm, Sweden, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to improvements in filtering devices for, for example, the separation of oil from air and other gaseous substances. The device may also be used for the separation of dust and water from air and other gaseous substances and for the separation of oil and slurries or the like from liquids.

According to the present invention there is provided a filtering device comprising a vessel having an inlet and outlet for fluid which communicate with opposite sides of an attachment plate dividing the interior of the vessel into two chambers and at least one filtering member within the vessel, the filtering member being formed by an elongate hollow body of fibrous material having an open end, means closing the opposite end, the open end portion of the filtering member being detachably engaged by a flange carried by the attachment plate, which flange surrounds an aperture in that plate, the closed end of the filtering member abutting a grid movable relative to the attachment plate.

One embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawing, in which:

Figure 1 shows a section through a filtering device according to the invention; and

Figures 2 and 3 show details on an enlarged scale of the attachment of the filtering members shown in Figure 1 in the bottom and the top of the device.

Reference number 1 denotes a vertically arranged vessel having a substantially circular cross-section, having spaced from the vessel bottom an inlet 2 and being provided with a removable closure or lid 3 having an outlet 4. The bottom of the vessel is provided

with a bottom outlet 5 and a filter inset 6 is positioned in the lower portion of the vessel for primary separation of liquid and/or solid particles from the fluid entering through the inlet 2. The vessel is divided into two chambers communicating with the inlet 2 and outlet 4 respectively by an attachment plate 9 which, as shown, is removably clamped by its peripheral portion between the lid 3 and a flange 14 on the vessel. Arranged above the inset 6 is a grid 7 which by means of a rod 8, is removably connected to the attachment plate 9 and adjustably positionable relative to the attachment plate. Clamped between the attachment plate 9 and the grid 7 are a number of hollow cylindrical filtering members 10. The upper ends of the members 10 are open and are inserted over downwardly projecting flanges 11 carried by the attachment sheet 9 and each surround an aperture in the plate. The flanges are cylindrical and have a diameter somewhat larger than the internal diameter of the filtering members 10, so that the ends of the members 10 have to be forced over the flanges and thereby have a sealing connection with the flanges. The lower ends of the filtering members abut against the upper surface of the grid 7 and are closed by means of plastics plugs 12. The grid 7 is preferably connected with the lower end portion of the rod 8 by means of a nut 13. The filtering members 10 are manufactured from a porous fibre material, e.g. glass fibre felt coated with synthetic resin, mineral wool, cellulose or the like.

The device functions in the following manner:—

With introduction of e.g. compressed air contaminated with oil, water, dust, etc. through the inlet 2, there is first obtained a primary separation of oil from the air in the inset 6. The stream of air then flows upwards in the container, and will before it passes out of the outlet 4 pass through the filtering members 10 on which contamination of the air will be effectively caught by means of mechanical adhesion and condensation. The condensed oil will sink in the bodies of the filtering members 10 and will finally collect in

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the bottom of the container where it can be drained through the outlet 5.

Due to the rather large surface area of the fibrous filtering members, the air speed will be low, the air resistance small and the ability of the filtering members to catch oil very large. This means that the device can be operated for a long time without need for the replacement of filtering members. With normal use such a member may be used for up to a year without replacement. Further, a filter replacement, when needed, can be carried out, due to the simple construction of the device, quickly and thus at very low cost.

By a selection of the fibrous material and the suspended mounting proposed according to the invention, of the filtering members in the container, the collected oil contamination will sink in the filtering members so that only about  $\frac{1}{8}$  of their height will be saturated by oil which then drops down to the vessel bottom. The filtering members will thus be automatically cleaned and their ability to separate oil will for this reason be considerably better than the ability of the devices hitherto used for the same purposes.

By the clamping of the attachment plate between the lid 3 and the container flange 14 there is obtained a good sealing such that the fluid introduced at inlet 2 is forced to pass through the filtering members. There is further achieved a good sealing at the attachment of the filtering members to the attachment plate 9.

There is thus provided a filtering device in which the separate filtering members are individually easily replaceable when required. This is achieved by means of the very simple attachment of the filtering members, the open end portions of the latter being engaged on the flanges projecting from the attachment plate, the lower ends of the members resting against the grid which, by means of one or more rods, is suspended from the attachment plate and positioned relative to the latter such that the filtering members are pressed in a direction towards the attachment plate and thus cannot be loosened from their engagement with the attachment plate. Complicated attachment devices for the filtering members are hereby eliminated. To replace a filtering member one only has to remove the lid of the vessel and then all the filtering members, in

mounted position, may be removed from the vessel, together with the attachment plate and grid. The removed assembly may then suitably be arranged upside down, i.e. with the attachment plate resting on a support, the grid thereupon being removed and the filtering members in question replaced.

The invention has been described in the foregoing for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims. Thus, many modifications could be carried out without departure from the scope of the invention. The form of the filtering members may be modified in many ways and they may have e.g. a triangular or square cross-section; also the longitudinal bores of the filtering members could have another cross-section than the circular cross-section shown in the drawing. In the latter case the flanges 11 carried by the attachment plate 9 and also the plastic plugs 12 must of course be shaped in a corresponding way.

#### WHAT I CLAIM IS:—

1. A filtering device comprising a vessel having an inlet and outlet for fluid which communicate with opposite sides of an attachment plate dividing the interior of the vessel into two chambers and at least one filtering member within the vessel, the filtering member being formed by an elongate hollow body of fibrous material having an open end, means closing the opposite end, the open end portion of the filtering member being detachably engaged by a flange carried by the attachment plate, which flange surrounds an aperture in that plate, the closed end of the filtering member abutting a grid movable relative to the attachment plate.

2. A filtering device as claimed in claim 1 wherein the vessel comprises a body portion and closure member, the attachment plate being clamped at its peripheral portion between the body portion and lid.

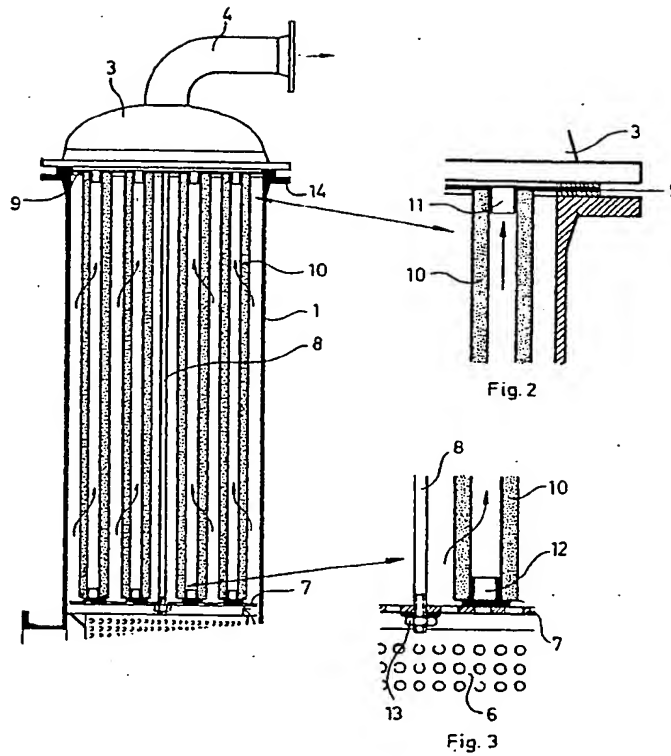
3. A filtering device substantially as herein described with reference to the accompanying drawing.

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